
Terrestrial Ecosystem Information Digital Data Submission Standard

Database and GIS Data Standards

Prepared by
BC Ministry of Water, Land and Resource Stewardship
Knowledge Management Branch
for the Terrestrial Ecosystems
Resources Information Standards Committee

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For more information about the Resources Information Standards Committee, please access the RISC website at: www2.gov.bc.ca/risc-standards or email RISCWeb@gov.bc.ca.

For more information about Terrestrial Ecosystem Information (TEI) please access the TEI website at: <https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/ecosystems/search-ecosystem-info>.

For more information or questions about these standards please email TEI_Mail@gov.bc.ca.

Preface

The Terrestrial Ecosystem Information (TEI) Digital Data Submission Standards describe the required steps for initiating TEI projects and the digital data specifications for TEI data with a focus on spatial data collected for use in Geographic Information Systems (GIS). The document consolidates all submission standards for TEI project types into a single framework for digital data submission. The standard aims to promote consistency across inventory methods and the mapping products by setting out general procedures and rules for initiating TEI projects and submitting data to the Ministry's Terrestrial Ecosystem Information System (TEIS) and other database systems. Its goal is to help the Province acquire and administer these data in an organized fashion throughout the province and commensurate with the objectives of the Resources Information Standards Committee (RISC).

The specifications outlined in the document describe the form (or structure) of the data to be delivered. The standards presented in this document do not attempt to describe the processes undertaken for digitally capturing the data, as there are a number of acceptable methods for data collection and capture. However, the standards and guidelines outlined in this document should be adhered to for all project types wherever possible, including, but not limited to, Business Area Project Identifier (BAPID) requests, file naming conventions, and deliverable data formats.

The digital standards work in conjunction with the TEI Contractor Package, which contains metadata, domain tables, layer files, and additional information such as checklists, QA procedures, tools, scripts, and templates for submission of TEI data.

It is anticipated that the information in this document will be useful to the community of terrestrial ecosystem, terrain, and wildlife habitat practitioners, including contractors or staff involved in collecting resource inventory data, managers charged with overseeing data-collection projects, and custodians maintaining resource inventory data sets.

Revision History

A summary of the previous versions of this standard including dates and the description or rationale for the changes is provided below.

Version	Date	Description/Rationale for Change
1.0	2010	Published draft document compiled without committee input but intended to gain feedback from practitioners in the ecosystem, terrain, and GIS mapping communities prior to finalization
1.1	2010	TEI internal review and updates. Version not published. Additional content and updates to the following sections: Introduction, Logical Data Description and Deliverables, Digital Data Capture Rules/ Requirements, Quality Assurance Procedures, and Appendices
2.0	2011	TEI internal review and updates. Version not published. Reorganization of major sections and subsections to group the information more logically in the document. Added all relevant non-spatial data formats, naming conventions, and requirements from previous digital standards to Non-spatial Data Specifications Section to replace earlier digital standards for TEM, PEM, and terrain.
2.1	2012	TEI internal review and updates. Version not published. Updates to Topology Implementation Section.
2.2	2015	TEI internal review and updates to published draft document. Additional content and updates to the following sections: Non-spatial Data Specifications, Spatial Data Specifications, and Appendices.
3.0	2023	Finalization of RISC Standard. Reorganization of major sections and subsections. Review, updates, and content added to all sections and incorporation of feedback compiled from practitioners in the ecosystem, terrain, and GIS mapping communities. Synchronization with TEI <i>Contractor Package</i> .

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The Government of British Columbia provides funding of the Resources Information Standards Committee (RISC) work, including the preparation of this document. The Resources Information Standards Committee supports the effective, timely, and integrated use of land and resource information for planning and decision making by developing and delivering focused, cost-effective, common provincial standards and procedures for information collection, management, and analysis. Representatives to the Committee and its Task Forces are drawn from the ministries and agencies of the Canadian and the British Columbia governments, including academic, industry, and First Nations involvement.

The Resources Information Standards Committee evolved from the Resources Inventory Committee (RIC), which received funding from the Canada-British Columbia Partnership Agreement of Forest Resource Development (FRDA II), the Corporate Resource Inventory Initiative (CRII), Forest Renewal BC (FRBC), and addressed concerns of the 1991 Forest Resources Commission.

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1 Introduction

1.1 Background

The Ecosystem Information Section, Knowledge Management Branch, BC Ministry of Water, Land and Resource Stewardship (WLRS; formerly with the Ministry of Environment and Climate Change Strategy) has undertaken the loading and storing of Terrestrial Ecosystem Information (TEI), including a variety of terrain, ecosystem, soils, and wildlife habitat information in the BC Geographic Warehouse (BCGW; formerly the Land and Resource Data Warehouse [LRDW]), for access by the public; the terrain, soils, wildlife, and ecosystem mapping communities; and other potential users of the data. TEI in British Columbia is defined as the inventory, mapping, and modelling of terrestrial ecosystems, soils, terrain, wildlife habitat, and species, and are collected and captured in accordance with established provincial Resources Information Standards Committee (RISC) standards. TEI inventories describe the physical and biological attributes of ecosystems. The Executive Director of the Knowledge Management Branch is the Provincial Data Custodian for all TEI collected and produced in accordance with the standards set by the RISC.

TEI business areas and inventory types include, but are not limited to:

- Broad Ecosystem Classification and Mapping
 - Ecoregion Classification
 - Broad Ecosystem Inventory (BEI)
 - Broad Ecosystem Mapping (BEM)
 - Broad Ecosystem Mapping Vegetation Resource Inventory (BEMVRI)
- Ecosystem Inventory and Mapping
 - Terrestrial Ecosystem Mapping (TEM)
 - Predictive Ecosystem Mapping (PEM)
 - Sensitive Ecosystem Inventory (SEI)
 - Wetland Inventory (WET)
- Species and Habitat Mapping
 - Species Distribution Modelling (SDM)
 - Wildlife Habitat Ratings (WHR)
- Soils Information and Mapping
 - Soil Survey Mapping
 - Soil Capability Mapping
- Terrain Inventory and Mapping
 - Bioterrain Mapping (TBT)
 - Terrain Inventory Mapping (TIM)
 - Terrain Stability Mapping (TSM)
 - Enduring Features
 - Exceptions Mapping

This document describes the required steps for initiating TEI projects and the digital data specifications for TEI data with a focus on spatial data collected for use in Geographic Information Systems (GIS). It is part of a series of related documents produced by RISC, which are intended to ensure that British Columbia government agencies are providing

resource information that meets recognized standards for quality and consistency. It is anticipated that the information in this document will be useful to the community of terrestrial ecosystem, terrain, and wildlife habitat practitioners, including contractors or staff involved in collecting resource inventory data, managers charged with overseeing data collection projects, and custodians maintaining resource inventory data sets.

1.2 Purpose of the Standard

This document consolidates all submission standards for TEI project types into a single framework for digital data submission. This standard aims to promote consistency across inventory methods and the mapping products they produce. It also sets out general procedures and rules for initiating TEI projects and submitting data to the Ministry's Terrestrial Ecosystem Information System (TEIS) and other database systems. Its goal is to help the Province acquire and administer these data in an organized fashion throughout the province and commensurate with the objectives of RISC. In order to load and store TEI data, the project files submitted to WLRS must be in the specified file formats, with the specified field names, field characteristics, and allowable codes, as outlined in this document. By providing standardizing procedures, mappers, contractors, government custodians, and users of the data all have consistent criteria for the management of TEI data.

This document defines the digital form and structure of TEI digital data to be submitted to the Province of British Columbia including:

- spatial data specifications;
- digital data capture;
- GIS quality assurance;
- non-spatial data specifications; and
- data submission.

This document addresses key provincial government objectives for digital data while also adhering to the provincial Data Management Policy (BC Ministry of Citizens' Services 2023) by:

- facilitating integration of digital spatial data into the provincial geographic data warehouse (i.e., BCGW) to share and make data openly available, wherever possible, in accordance with the Open Information and Open Data Policy (BC Ministry of Labour, Citizens' Services and Open Government 2011);
- facilitating integration of digital spatial data by adhering to provincial standards for georeferencing resource inventory data sets; and
- providing quantitative and qualitative measures of data quality to ensure that data-collection efforts are effective, and to ensure that the Province receives good value in contracted projects.

1.3 Scope of the Standards

The digital standards focuses on providing required standards and guidelines to those who are responsible for digital data submission of Terrestrial Ecosystem Information (TEI) to the Province of British Columbia. The specifications outlined in the document describe the form

(or structure) of the data to be delivered. These standards describe basic georeferencing and digital data definitions for TEI, including coordinate systems, registration, and logical and physical descriptions for attribute and spatial aspects of TEI data. They also describe, recommend, or prescribe methods for digital data storage and submission, quality assurance, graphic data representation, and capture of project metadata. The standards presented in this document do not attempt to describe the processes undertaken for digitally capturing the data, as there are a number of acceptable methods for data collection and capture. However, the standards and guidelines outlined in this document should be adhered to for all project types wherever possible, including, but not limited to, Business Area Project Identifier (BAPID) requests, file naming conventions, and deliverable data formats. Any new projects defined as being completed to provincial standards must also meet the digital standards criteria. It is recommended that all TEI-related mapping and inventory projects adhere to the standards listed in the digital standards document.

The digital standards work in conjunction with the TEI *Contractor Package*, which contains metadata, domain tables, layer files, and additional information such as checklists, QA procedures, tools, scripts, and templates for submission of TEI data. The *Contractor Package* enforces many of the digital data capture and GIS quality assurance procedures outlined in Sections 3 and 4. It is also designed and intended to be an updatable resource that will be revised as new tools and templates are developed across TEI project types. Section 3 provides additional information on digital data capture requirements, including use of the *Contractor Package* and its various components. Please contact TEI_mail@gov.bc.ca for information on the status and availability of new tools and templates, including but not limited to Soil Surveys (SOIL), Species Distribution Models (SDM), or Wildlife Habitat Ratings (WHR) tools and templates.

The digital standards also include and build on information from related TEI standards and guidelines, as well as related classification standards and guidelines such as the Resources Inventory Committee's (RIC) Standard for Terrestrial Ecosystem Mapping in British Columbia (RIC 1998a), the Field Manual for Describing Terrestrial Ecosystems (BC FLNRO and BC MOE 2010 ver. 2023), and the Terrain Classification Manual, Version 2.0 (Howes and Kenk 1997). A list of TEI standards and guidelines can be found on the TEI website at: <https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/ecosystems/tei-standards>

This standards document supersedes previous draft versions, which were compiled without committee input but were intended to gain feedback from practitioners in the ecosystem, terrain, and GIS mapping communities prior to finalization.

- Terrestrial Ecosystem Information Digital Data Submission Standard – Draft for Field Testing; Version 2.2 (2015)
- Terrestrial Ecosystem Information Digital Data Submission Standard – Draft for Field Testing; Version 1 (2010)

This version (3.0) of the digital standards replaces the related data submission sections of the following previous Digital Standards and any associated addenda or errata:

- Standard for Terrestrial Ecosystem Mapping (TEM) – Digital Data Capture in British Columbia: Ecosystem Technical Standards and Database Manual, Version 3.0 (RIC 2000a)
- Standard for Terrestrial Ecosystem Mapping (TEM) – Digital Data Capture in British Columbia, Version 3.0 (2000), Errata No. 1.0 (RISC 2004a)

- Standard for Predictive Ecosystem Mapping (PEM) – Digital Data Capture:, Predictive Ecosystem Technical Standards and Database Manual, Version 1.0 (RIC 2000b)
- Standard for Predictive Ecosystem Mapping (PEM) – Digital Data Capture in British Columbia, Version 1.0 (2000), Errata No. 1.0 (RISC 2004b)
- Standard for Digital Terrain Data Capture in British Columbia: Terrain Technical Standard and Database Manual, Version 1 (RIC 1998b)
- Standard for Digital Terrain Data Capture in British Columbia: Terrain Technical Standard and Database Manual, Version 1 (1998): Errata No. 2006-1.1 (RISC 2007)
- Standard for Mapping Ecosystems at Risk in British Columbia: An Approach to Mapping Ecosystems at Risk and Other Sensitive Ecosystems, Version 1.0 (RISC 2004c)
- Wildlife Habitat Rating Data Submission Standards, Version 2.2 (RISC 2004d)
- Digital Data Standards for Species Distribution Modelling, Version 1.0 (RISC 2008)

1.4 Intended Users of the Standards

This document is technical in nature, and is intended for persons compiling, managing, and/or using TEI digital data.

The community of terrestrial ecosystem, terrain, and wildlife habitat practitioners, including contractors and government staff involved directly with collecting TEI data, will refer to this document for specific technical guidance on the form and structure of the data sets they prepare. Managers of such data collection projects will use this document to help evaluate whether resource inventory projects have been properly prepared and reviewed prior to submission. End-users will also use this document for clarification of the meaning and structure of TEI data to be used in analysis and graphic display. This document does not address the quality of the mapping with regards to professional judgement or professional reliance requirements.

1.5 Professional Governance

Terrestrial Ecosystem Information (TEI) and data including ecosystem mapping within British Columbia are governed by the principles of professional governance under the *Professional Governance Act* (PGA). The quality and reliability of the mapping data, particularly any new or updated data, rest on the professionalism of individual mappers. The intended audience for these standards is the community of terrestrial ecosystem, terrain, and wildlife habitat practitioners, and these standards require that practitioners, or the leader of a team of practitioners, be qualified professionals in good standing as defined in the PGA, as they are bound by a professional code of practices that will be applied to the delivery of TEI and data. TEI mapping projects may fall under the reserve practice of one or more regulatory bodies. Projects may include interdisciplinary teams, and practitioners must keep up to date on areas of “reserved practice” under the PGA to ensure that project teams and project sign-off is adhering to the requirements under the PGA.

The five regulatory bodies currently included under the PGA and oversight of the Office of the Superintendent of Professional Governance (OSPG) are:

- Association of BC Forest Professionals (ABCFP) (i.e., Registered Professional Forester - RPF)
- Applied Science Technologists and Technicians of BC (ASTTBC)

- BC Institute of Agrologists (BCIA) (i.e., Professional Agrologist - PAg)
- College of Applied Biologists (CAB) (i.e., Registered Professional Biologist - RPBio)
- Association of Professional Engineers and Geoscientists of BC, known as Engineers and Geoscientists of BC (EGBC) (i.e., Professional Geoscientist - PGeo).

2 Project Initiation

Project planning during project initiation is an essential component of any ecosystem mapping or inventory project. The preparation of a clear and comprehensive statement of objectives and purpose is best accomplished collaboratively by those who will be responsible for the project including the data custodian (TEI Unit), the funding agent(s), the proponent, the practitioner(s), First Nations, and, where possible, the users of the information.

The project requirements and methodology for a project should also be determined at this stage, including considerations such as, but not limited to:

- the type of work that will be performed;
- the project type that will be used;
- the professionals required to do the work;
- the project timeline and seasonal considerations;
- First Nations engagement and collaboration;
- the use of existing data, if available and relevant to the project;
- the mapping attributes required to meet the objective and purpose of the project;
- the applicable standards that will apply to the project and any deviations/variances, including the treatment of special features;
- the field planning and logistics, if field work is required to complete the project;
- the proposed survey intensity level/terrain survey intensity level (SIL/TSIL);
- the scale of the data collection and final mapping product;
- data access (i.e., Open Data and data sharing agreements); and
- outreach opportunities.

Consultation with the TEI Unit and other government specialists, such as Regional Ecologists, Soil Scientists, Geomorphologists, Hydrogeologists, and Wildlife Biologists, should occur at this stage. Expected primary users, interim applications, and end use of the project should be documented. Project sensitivities and/or need for inclusion in provincial data repositories, should be established. The TEI Unit should be consulted during project planning phases to verify the status of current data and information, with communication throughout all phases that the project recommended. Information requests can be submitted to TEI_mail@gov.bc.ca. The TEI *Contractor Package* also includes additional resources that document TEI data processes and workflows.

2.1 First Nations Engagement and Collaboration

Collaborating with First Nations is encouraged and legal consultation may also be required depending on the nature and geographic location of the project and the Nation(s) on whose traditional territory(ies) the project will occur. Engagement with Nations should occur as early as possible in the planning stages and involve the data custodian (TEI Unit), the funding agent(s), the proponent, and the practitioner(s), wherever possible. This process can aid in building relationships, sharing information, developing joint priorities and data, and ensuring

key values are considered as part of project scoping. Collaborations with First Nations must comply with any legal requirements, best practices, and other guidance established under the PGA framework.

To identify which First Nation(s) may be interested in a project over an area of interest, the Contacts for First Nation Consultation Areas, is available as an online, interactive mapping tool that provides contact information. More information can be found here:

<https://www2.gov.bc.ca/gov/content/data/geographic-data-services/land-use/contacts-for-first-nation-consultation-areas>

Additional resources about engaging First Nations and the Province's legal obligations to consult and accommodate First Nations may be found here:

<https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/consulting-with-first-nations>

2.2 Use of Existing Information and Data

Compiling background information and data during project initiation supports mapping, field planning and production of the final report. The project report must contain a review of existing data and information (refer to Section 5.2).

Background information, outside of TEI data, may exist through various sources, including provincial repositories or search engines such as:

- Cross-Linked Information Resources (CLIR)
 - <https://www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/libraries-publication-catalogues/cross-linked-information-resources-clir>
- BECWeb
 - <https://www.for.gov.bc.ca/hre/becweb/index.html>
- BC Data Catalogue
 - <https://catalogue.data.gov.bc.ca/>

CLIR allows users to search for documents in the following databases:

- BC Species and Ecosystems Explorer (BCSEE). Data and information about plants, animals, and ecosystems.
- Ecological Reports Catalogue (EcoCat). Reports from a variety of disciplines on water quality and water quantity, reservoirs, floodplain mapping, groundwater, fish and fish habitat, wildlife and wildlife habitat, terrestrial information, soils, and vegetation.
- Biodiversity/Environmental Information Resources e-Library (EIRS BDP). A range of environmental and natural resource information, including publications on British Columbia's species and their habitats.
- Environmental Protection Information Resources e-Library (EIRS EP). A range of information on environmental protection in British Columbia, including publications on air quality, water quality, climate change, solid and liquid waste, recycling, and product stewardship.
- J.T. Fyles Natural Resources Library. A multiple-ministry natural resource sector library.

BECWeb contains links to spatial Biogeoclimatic Ecosystem Classification (BEC) mapping, the Regional Field guides (Land Management Handbooks – LMHs) as well as information on

the classification of Non-forested Ecosystems, including the Biogeoclimatic Ecosystem Classification of Non-forested Ecosystems (nBEC) in BC (TR068, MacKenzie 2012) and Wetland and Riparian Ecosystems including Wetlands of British Columbia: A Guide to Identification (LMH 52) (MacKenzie and Moran 2004). Ministry of Forests Regional Research Vegetation (and BEC) Ecologist contact information is also distributed through BECWeb.

The BC Data Catalogue contains numerous provincial datasets, outside of TEI data, that may be used to inform or are directly incorporated into TEI mapping products. These include but are not limited to:

- Administrative boundaries (Provincial, Regional, Municipal, Private Lands, Parks and Protected Areas etc.)
- First Nations layers (communities, treaty areas, treaty lands, statement of intent boundaries etc.)
- TRIM Enhanced Base Map (contours, watercourses, land cover. etc.)
- BEC Zone/Subzone/Variant/Phase map
- Fresh water atlas watersheds, lakes, streams, and wetlands
- Disturbance layers (forest harvesting, fire history etc.)
- Management-level boundaries (Ungulate Winter Range, Wildlife Habitat Areas, Old Growth Management Areas etc.)
- Vegetation Resources Inventory

Background information sources should not be limited solely to provincial repositories as there may be relevant information from other sources (e.g., other levels of government, professional organizations, and educational institutions).

There may also be existing TEI mapping and data that overlap an area of interest that may be appropriate to use as part of a new project, either as background information or by directly incorporating it. Where existing data intersect or abut the project area, additional steps are necessary early in the project to evaluate and decide how these data are to be incorporated (Table 1).

It is critical to review metadata and associated documentation, including project reports associated with existing data as they are a source of key information about content, purpose, intended use, and any issues or known limitations. The review of existing data should not only include a verification of the data coverage or extent by type, but also evaluate the data content (i.e., information or attributes contained within the data) and quality of the data (resolution, accuracy, completeness, age, scale, polygon size – minimum/ maximum/average, level of verification – field/Quality Assurance (QA)/Accuracy Assessment (AA), mapper experience etc.). The examination of such information should not be restricted to projects that overlap or edge tie to the study area but should also include surrounding areas for which applicable information will be of benefit in to understanding landscape relationships, including studies at broader scales.

Due diligence must be exercised in the evaluation of these data sources. The terrestrial ecosystem, terrain, soils, wildlife habitat, and GIS practitioner(s) in consultation with the data custodian (TEI Unit), the funding agent(s), and the proponent, wherever possible, should determine how relevant background information and existing data will inform or be incorporated into the project outputs (Table 1). The TEI Unit and other government specialists, such as Regional Ecologists, Soil Scientists, Geomorphologists, Hydrogeologists, and Wildlife Biologists, should be contacted to discuss existing projects and to ensure that the most up-to-date information is used.

The *Contractor Package* templates and tools can be run against existing data to identify any data standards issues that may need to be rectified. If the data are planned to be used for more than just background information in support of a new project, professionals signing off on the new product must ensure that any existing data incorporated are updated to current mapping and digital standards. This may include, but is not limited to, edge-matching, as well as classification, coding, and data structures used. If using mapping completed by another practitioner, each professional (e.g., bioterrain mapper or ecosystem mapper) is responsible for their own assessment of any data integrated into a new project and must be able to sign off on all data included in the final product. To guide the evaluation of existing data, example levels of use are provided in Table 1.

Table 1: Example levels of use and evaluation considerations for existing data

Level of Use	Evaluation Considerations
Use As Is (No Updates Required)	Existing data are appropriate for the project purpose and are to be used as-is, retaining the original mapping. If mapping is required outside of the existing mapping, new mapping will be edge-tied to existing mapping. Data limitations and assumptions relevant to the current project are documented.
Use After Updates (Updates Required)	Existing data are appropriate for the project purpose but updates are necessary (incorporation of new BGC linework, new coding, new fields/attributes, etc.). If mapping is required outside of the existing mapping, new mapping will be edge-tied to existing mapping. Data updates, limitations, and assumptions relevant to the current project are documented.
Partial Use	A portion of the existing data is appropriate for the project purpose (specific fields/attributes, selected polygons etc.). If mapping is required outside of the existing mapping, new mapping will be edge-tied to existing mapping. Data updates, limitations, and assumptions relevant to the current project are documented.
Background Information Use	Existing data are reviewed and deemed not appropriate for incorporation into the project but are provided to project team as background resources. The review process and justification for not incorporating (did not meet the project requirements [e.g., mapping scale] but contains relevant data to inform the current project etc.) are documented.
Not For Use	Existing data are reviewed and deemed inappropriate for the project, either for incorporation or as background information. The review process and justification for not using (did not conform with project scope, outdated information etc.) are documented.

2.3 Requesting a BAPID

To effectively track the progress of multiple TEI projects, and the digital deliverables associated with each of these projects, a Business Area Project Identifier (BAPID) is assigned at the project level. A BAPID is a unique numerical identifier used in the naming of all project files, folders, and feature classes, as well as any project correspondence. The BAPID number assigned to a project is applied to all associated project components (spatial data, tables, reports, photographs, etc.) and maintains the link between components and project metadata.

Multiple BAPIDs can be assigned for components of projects spanning multiple years or covering large areas and can involve the submission of interim project deliverables. Related projects and their relationship to each other should be documented in project metadata and in correspondence with the TEI Unit and Regional Ecologist(s). All anticipated interim and final deliverables, as well as their corresponding related BAPID list, should be outlined when requesting a BAPID. For example, BAPID 1234 is replacing older mapping in BAPID 2345, or BAPID 3456 and 7890 are being combined and will be replaced by BAPID 9123.

A BAPID should be requested at project initiation and basic project-level information must be provided using the TEI Project Information Submission template. This template as well as additional resources can be found within the *Contractor Package* (<http://www.env.gov.bc.ca/esd/distdata/ecosystems/TEI/ContractorPackage/>). Mandatory fields are identified in the template; however, all fields should be populated, wherever possible. It is optional to provide a project boundary footprint at this stage, preferably in Esri File Geodatabase (FGDB) version 10.6 or higher format. A project boundary feature class template (*Template_Empty_Project_Boundary*) is provided within the *Tools_and_Templates.gdb* in the *Contractor Package* and can be used to assist with preparing a project boundary for submission. The mandatory fields provided are necessary to track, capture, and manage all TEI projects.

TEI projects submitted to the Province are added to the provincial TEI data repository and distributed under an Open Government Licence (<https://www2.gov.bc.ca/gov/content/data/open-data/open-government-licence-bc>), and therefore, submitters must have the authority to grant the distribution of the submitted data under the Open Government Licence terms and conditions. As such, during the BAPID request, the submitter is required to provide confirmation of the authority to share the data and understands that the data will be distributed under an Open Government Licence as well as report any potential data sensitivities. The TEI Unit has alternative publishing procedures in place to deal with “sensitive” project data, should there be a circumstance where publication restrictions are required. Alternative publication options include publishing the project boundary only and/or restricting data access to specified user groups. Based on the evaluation of the submission by the TEI Unit, it will be determined if formal Data and Information Sharing Agreement (DISA) is required.

2.4 Requesting a Standards Variance

As noted in Section 1, the TEI digital standards are to be used in conjunction with the applicable TEI inventory standards. These standards represent the currently accepted best management practices for TEI inventory and data collection. It is recognized that variances to these standards may be justified. In particular, any procedures that deviate from RISC standards (use of new technologies, mapping in 2D as opposed to 3D, etc.) must be documented in project metadata and reports, and be approved by the TEI Unit. Procedures that are in addition to, or are optional to, the RISC standards (e.g., additional interpretive

products) must also be reported but do not require approval. Understanding client expectations and communicating the limitations of the mapping of the project will help to minimize conflict and manage expectations for the project deliverables.

Requests for variances to the TEI inventory and/or digital standards must be submitted to the TEI Unit for approval during project initiation as part of the BAPID request process. Requests should be sent to TEI_mail@gov.bc.ca using the *TEI Project Information Submission* template located within the *Contractor Package*. A description of the variance(s), justification, and limitations should be provided.

As part of project planning and prior to project initiation, variance requests can be submitted by proponents or practitioners, in order to aid in developing project funding, scoping, and resourcing options. In the event variances were not requested prior to or during project initiation, they can be reported to the TEI Unit using the *TEI Project Information Submission* template.

Following review by the TEI Unit, the submitter will be notified of review results and if the variance is approved it must be reported in project metadata and reports, where applicable. It should be noted, however, if requested or reported variance(s) are not approved, these projects would not meet the definition of being completed to provincial standards and the resulting project data cannot be classified as meeting provincial standards or be considered a RISC standard project. The procedures or methods that deviate from, are in addition to, or are optional according to RISC standards must still be reported in project metadata and reports.

2.5 Proposing Changes to (variant-level) Biogeoclimatic Linework

Any proposed changes to the provincial Biogeoclimatic (BGC) linework must be approved by the Ministry of Forests Regional Research Vegetation (and BEC) Ecologist for the Region in which the change is proposed prior to the production and submission of the final mapping. All submissions for BGC linework changes should be sent to TEI_mail@gov.bc.ca using the *TEI Project Information Submission* template located within the *Contractor Package* and include the rationale for the proposed changes along with supporting data (e.g., FS882 full plots or equivalent) with spatial plot locations (in Esri FGDB version 10.6 or higher format) for latitudinal and longitudinal shifts, or helicopter-based, spatially explicit documentation of overstorey and understorey species cover supporting elevation shifts.

Following review by the Ministry of Forests Regional Research Vegetation (and BEC) Ecologist, the submitter will be notified and if the linework changes are approved the mapping can be finalized. These updates must be reported in project metadata and reports, where applicable.

2.6 Proposing New Ecosystem Codes

The *TEI Ecosystem Mapping Codes* list contains the current standard TEI approved ecosystem mapping codes for use with TEI mapping projects. The list can be accessed within the *Contractor Package* and here:

- https://www.env.gov.bc.ca/esd/distdata/ecosystems/TEI/Docs/TEI_EcosystemCodes.xlsx

Codes not included in the *TEI Ecosystem Mapping Code* list are not for use without TEI and Ministry of Forests Regional Research Vegetation (and BEC) Ecologist(s) approval. Requests

for proposing new ecosystem unit/code(s) can be submitted to TEI_mail@gov.bc.ca using the *TEI Project Information Submission* template as well as the *TEI Ecosystem Code Submission* template table in the *Stage1.gdb* within the *Contractor Package* (<http://www.env.gov.bc.ca/esd/distdata/ecosystems/TEI/ContractorPackage/>). The information submitted must include the BAPID, natural resource region, BGC Unit, proposed ecosystem unit coding, unit name and description, the justification for requiring a new ecosystem code, and supporting plot data (in Esri FGDB version 10.6 or higher format). In general, a minimum of three full (FS882) plots are required for initial classification assessments by Ministry of Forests Regional Research Vegetation (and BEC) Ecologists. Any new values proposed must follow standard three number coding and ecosystem naming conventions (i.e., 000 for “Site Series” and user assigned “Map Code” values), including matching the “Field Type” and “Length” for the existing long table fields (see the *Database Dictionary* in the *Contractor Package*).

Following review by the TEI and Ministry of Forests Regional Research Vegetation (and BEC) Ecologist(s), the submitter will be notified and if approved the codes can be applied to the mapping project. These non-published but approved codes must be populated within the *TEI_Usr_Dfn_Domains* table. This table is located in the *Stage1.gdb* within the *Contractor Package* and must be submitted with the final operational geodatabase as per the TEI Digital Data Submission Standards. Values in the submitted feature classes and tables must conform to the domains, ranges, and cross-field relationships as specified in the *Contractor Package Tools_and_Templates.gdb Metadata_Items* (i.e., *Database Dictionary*) and *Metadata_Tables* (i.e., *Domains_Ranges*). The *Database Dictionary* and *Domains_Ranges* tables are also provided in Excel™ format within the *Contractor Package*. This submission will initiate the process to update the *TEI Ecosystem Mapping Code List* and associated *Contractor Package* domains to allow validation of the final ecosystem mapping product. These codes must also be reported in other project metadata and reports, where applicable.

3 Digital Data Capture

This section contains information related to the capture and quality of data submitted. While this information is meant to assist in the creation of digital data, the definitive source is the appropriate data capture standard for the project type being worked on.

3.1 Contractor Package

The use of the *Contractor Package* tools and templates is highly recommended for data capture and is required for submission to TEI provincial repositories. For data to be considered as being completed to provincial standards, data submitted must align with the information, metadata, domain tables, tools, scripts, and templates included in the *Contractor Package*. All data submitters must ensure that the data captured meet these requirements. Contractors working for the Ministry will be required to address any formatting issues and/or erroneous content prior to the Ministry’s final acceptance of the data. The Ministry will validate all project deliverables for final acceptance.

3.1.1 Minimum Hardware/Software Requirements

The *Contractor Package* is designed to work with the ArcGIS Desktop suite of products by Esri, version 10.6 or higher. All requirements for hardware and software can be found at [https://desktop.arcgis.com/en/system-requirements/10.6/arcgis-desktop-system-](https://desktop.arcgis.com/en/system-requirements/10.6/arcgis-desktop-system-requirements/)

[requirements.htm](#). The *Contractor Package* is not yet optimized to work ArcGIS Pro (Python 3.x).

3.1.2 Source

The current version of the *Contractor Package*, and related documentation, can be obtained from the following web site:

- <https://www.env.gov.bc.ca/esd/distdata/ecosystems/TEI/ContractorPackage/>

3.1.3 Licensing

The *Contractor Package* is authorized for capture of RISC standard TEI data to be submitted to the TEI data custodian and published through the BCGW and the DataBC Open Data Catalogue. Any other uses require written permission obtained from the Ministry of Water, Land and Resource Stewardship at TEI_mail@gov.bc.ca. The *Contractor Package* is not authorized for redistribution or modification.

3.2 Spatial Data Formats

During the data capture, development, and quality control stages, project data may be in several formats as required for internal use. For final delivery to the Province, data must be loaded into the provided template feature classes included in the *Contractor Package* (see Section 3.3).

Capturing data directly into the provided templates in the *Contractor Package* enforces data standards such as the coordinate system (i.e., BC Environment Albers projection), feature type (i.e., single-part polygons), and database structure requirements that adhere to metadata standards outlined in the *Tools_and_Templates.gdb*, *Metadata_Items* table, as well as domains.

3.2.1 Coordinate System

Data must be submitted to the Province in the BC Environment Albers projection. This projection is already assigned to the feature class templates included in the *Contractor Package*.

In the BC Environment Albers projection, locations are specified in terms of rectangular (projection) coordinates that specify northing, easting, and elevation. Northing and easting are stored in metres. The parameters of the BC Environment Albers projection are as follows:

- **Projection:** Albers
- **Units:** Metre (stored without offsets [e.g., in direct Albers projection coordinates])
- **Datum:** NAD83 (GRS80) - North American Datum 1983, with earth-centred ellipsoid derived from Geodetic Reference System 1980
- **Central Meridian:** 126° 00' 00" West Longitude (-126.0)
- **First Standard Parallel:** 50° 00' 00" North Latitude (50.0)
- **Second Standard Parallel:** 58° 30' 00" North Latitude (58.5)
- **Latitude of Projection Origin:** 45° 00' 00" North Latitude (45.0)
- **False northing:** 0.0m
- **False easting:** 1000000.0m

When defining the coordinate system of raw spatial data, or reprojecting data from a different coordinate system, use the NAD_1983_BC_Environment_Albers projection. This projection is defined by the Open Geospatial Consortium (OGC) coordinate system specification string, which is:

- PROJCS["NAD_1983_Albers",GEOGCS["GCS_North_American_1983",DATUM ["D_North_American_1983",SPHEROID["GRS_1980",6378137.0,298.257222101]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]],PROJECTION ["Albers"],PARAMETER["False_Easting",1000000.0],PARAMETER ["False_Northing",0.0],PARAMETER["Central_Meridian",-126.0],PARAMETER["Standard_Parallel_1",50.0],PARAMETER ["Standard_Parallel_2",58.5],PARAMETER["Latitude_Of_Origin",45.0],UNIT ["Meter",1.0]]

3.2.2 Cartographic Products

Cartographic products, such as digital or printed maps, should follow best practices for map design and content. As the design and content of maps are often based on the project needs and objectives, there are no default map templates provided in the *Contractor Package*. All maps must be provided in georeferenced pdf format ensuring that the mapped content included in cartographic products are georeferenced. Image formats such as .jpg, .png, .svg, .gif, and .tif are not acceptable as a sole submission, but may be provided in addition to the georeferenced pdfs. If maps are imbedded in pdf reports, a copy of these maps must be provided as separate georeferenced pdfs with submission following the naming conventions outlined in Section 5.1.

The quality of both digital and printed maps must be sufficient to maintain legibility. Where printed maps are provided to the Province, they must be accompanied by a digital equivalent. For digital products, the resolution of the file must be sufficient for both digital display and print production. Label text must be legible, and acronyms and abbreviations must be defined in the map legend.

Annotation layers, as defined in older versions of Esri software, are not a standard requirement. If created, they must be delivered in the *Operational_data_<BAPID>.gdb*. If project mapping includes annotation layers containing label text that does not belong in any attribute field of submitted feature classes, this information must be included in the User-Defined Data process (see Section 3.6).

The following map elements are required for all cartographic products submitted to the Province:

- title
- mapsheet(s)
- version number
- date created
- last update date (where applicable)
- author(s)
- legend
- scale
- scale bar
- north arrow (at map centre)

- projection and datum
- base map
- data sources
- neatline
- grid (either lat/long or UTM)
- fiducial tickmarks (where appropriate)
- text stating “Made in Canada”

In addition, federal cartographic symbol standards for geological map production, including terrain, bioterrain, and terrain stability mapping, can be found at:

- <https://geoscan.nrcan.gc.ca/starweb/geoscan/servlet.starweb?path=geoscan/fulle.web&search1=R=327025>

3.3 Feature Class Description

The purpose of this section is to describe all spatial data accepted for submission. The intent is to provide a single integrated definition of the data (logical and physical) that is unbiased toward any single application of collected data and is independent of how the data are physically stored or accessed. The intent is to provide a common understanding of the data as well as provide a basis for systems database design and definition of the Physical Data Description.

Submitted spatial data must be loaded into the *Operational_data_<BAPID>.gdb*, which is automatically produced by running the script tools provided in the *Contractor Package*.

There are two primary datasets that must be present in the submitted *Operational_data_<BAPID>.gdb*: the *TEI_Long_Tbl* feature class, which contains the detailed polygon information for all project types, and the *TEI_Project_Details* table, which contains project-level metadata for the project. These two datasets are mandatory deliverables for all projects. For SEI, WHR, and SDM project types, metadata table requirements referred to in previous standards can be replaced by using the *TEI_Project_Details* table using the equivalent, related, and additional fields provided. See the *Database Dictionary* or the *Metadata_Tables* table located in the *Tools_and_Templates.gdb* in the *Contractor Package* for the full data dictionary for each of these feature classes.

Mandatory Feature Class Deliverables

- Terrestrial Ecosystem Information Long Table Polygons (*TEI_Long_Tbl*)
 - contains TEI polygons with full RISC standard attributes. These polygons and associated attribute data describe the physical and biological characteristics of ecosystems at varying scales (i.e., 1:1 000 to 1:50 000). *TEI_Short_Tbl* and *TEI_Project_Boundaries* are derived from the *TEI_Long_Tbl*.
- Terrestrial Ecosystem Information Project Details Table (*TEI_Project_Details*)
 - contains attributes describing each project (project-level metadata), plus links to the locations of other data associated with the project (e.g., reports, polygon datasets, plot files, legends). The *TEI_Project_Details* table is the authoritative

provincial data for TEI project metadata by BAPID. *TEI_Project_Boundaries* is derived in part from this table.

Mandatory (If Collected) Feature Class Deliverables

If data corresponding to any of the following feature classes are collected, then submission of these feature classes is mandatory. See the *Database Dictionary* or the *Metadata_Tables* for the full data dictionary for each of these feature classes.

- Terrestrial Ecosystem Information Linear Sample Site Locations (*TEI_Sample_Site_Lines*)
 - contains linear field traverses (transects) where inventory data are collected, and the *TES_TAG* that links to the original field data (such as cross sections).
- Terrestrial Ecosystem Information Point Sample Site Locations (*TEI_Sample_Site_Points*)
 - contains the point locations of field sites where inventory data are collected, and the *TES_TAG* that links to the original field data (such as *ECI_TAG* linking to plot data [i.e., VPro]).
- Terrestrial Ecosystem Information Lines (*TEI_Lines*)
 - contains lines used to highlight features not adequately delineated and described by *TEI_Long_Tbl* polygons (i.e., linear features that are different or outside of the projects defined mapping scale, including long and linear or small and narrow features such as landslide tracks or eskers).
- Terrestrial Ecosystem Information Points (*TEI_Points*)
 - contains points used to highlight features not adequately delineated and described by *TEI_Long_Tbl* polygons (i.e., point features that are different or outside of the projects defined mapping scale, including small features such as landslide headscarps, mineral licks, or significant trees).
- Terrestrial Ecosystem Information Polygons (*TEI_Polys*)
 - contains polygons used to highlight features not adequately delineated and described by *TEI_Long_Tbl* polygons (i.e., area-based polygon features that are different or outside of the projects defined mapping scale, including large or small features such as block fields or large earthflow features or small tree patches).
- Terrestrial Ecosystem Information User-Defined Data (*TEI_Usr_Dfn_Data*)

- contains user-defined (project-specific) data relating to user-defined fields and values at the polygon level. The records in the *TEI_Usr_Dfn_Data* table must match 1:1 with those in *TEI_Long_Tbl*.
- Terrestrial Ecosystem Information User-Defined Fields
(*TEI_Usr_Dfn_Fields*)
 - contains project-specific field names, definitions, and descriptions for user-defined fields (i.e., fields that are not RISC standard).
- Terrestrial Ecosystem Information User-Defined Domains
(*TEI_Usr_Dfn_Domains*)
 - contains user-defined (project-specific) values, including names and descriptions, which correspond to user-defined fields or existing fields (i.e., fields and attributes that are not RISC standard).
- Terrestrial Ecosystem Information Ecosystem Code Submission
(*TEI_Ecosystem_Code_Submission*)
 - contains proposed new ecosystem unit/code(s) and supplemental information submitted for Ministry approval. Justification for requiring a new ecosystem code and the unique plot numbers that correspond to the required field data submission are also included. Any non-published but approved codes must be populated within the *TEI_Usr_Dfn_Domains* table and submitted with final deliverables.

Optional Feature Class Deliverable

If data corresponding to any of the following feature classes are collected, then submission of these is optional. See the *Database Dictionary* or the *Metadata_Tables* for the full data dictionary for each of these feature classes.

- Terrestrial Ecosystem Information Project Boundaries Polygons(s)
(*TEI_Project_Boundaries*)
 - contains TEI project boundaries (study areas) and attributes describing each project (project-level metadata), plus links to the locations of other data associated with the project (e.g., reports, polygon datasets, plot files, legends). This feature class is derived from *TEI_Long_Tbl* and *TEI_Project_Details*.
- Terrestrial Ecosystem Information Short Table Polygon Attributes
(*TEI_Short_Tbl*)
 - contains TEI polygons with key and amalgamated (concatenated) attributes derived from the *TEI_Long_Tbl*.
- Terrestrial Ecosystem Information Long Table Polygon Lines (*TEI_Long_Tbl_Arcs*)

- contains the polygon arcs corresponding with the *TEI_Long_Tbl* feature class polygons, with feature codes (FCODEs) representing line reliability: solid (definite), dashed (approximate), and dotted (assumed) as described in Guidelines and Standards for Terrain Mapping in BC (RIC 1996). If it is stated in the *Proj_Com* field and in the report that “all polygon lines are assumed solid in the *TEI_Long_Tbl* unless otherwise superseded by the *TEI_Long_Tbl_Arcs* feature class,” then only dashed and dotted line types need be collected.
- Terrestrial Ecosystem Information Polygon Lines (*TEI_Polys_Arcs*)
 - contains the polygon arcs corresponding to the *TEI_Polys* feature class, with FCODEs representing line reliability solid (definite), dashed (approximate), and dotted (assumed) as described in Guidelines and Standards for Terrain Mapping in BC (RIC 1996). If it is stated in the *Proj_Com* field and in the report that “all polygon lines are assumed solid *TEI_Polys* unless otherwise superseded by the *TEI_Polys_Arcs* feature class,” then only dashed and dotted line types need be collected.

3.4 Linkages to Attributes and Feature Classes

As defined in Section 2.3, **BAPID** is the name of the numerical attribute that maintains the link between project polygons (in *TEI_Long_Tbl* feature class) and project metadata (in the *TEI_Project_Details* table). See Section 2.3 for information on requesting a BAPID number for a project.

The **PROJPOLYID** (Project Polygon Identifier) attribute maintains the link between standard detailed attribute polygons and user-defined data tables. It is a unique identifier (unique within the BAPID) up to 50 characters.

The **TEIS_ID** (Terrestrial Ecosystem Information Identifier) is a long integer attribute that maintains the link between inventory polygons in the *TEI_Long_Tbl* feature class and related features, such as the *DomainErrors* table. At the project level, within Provincial datasets, the *TEIS_ID* is not enduring, as it is regenerated every time the *Set TEIS_ID* script is run.

While there are no explicitly defined relationships in the TEI database at this time, the *TEIS_ID*, *PROJPOLYID*, and BAPID are the key fields used to link all data sets in the provincial operational data holdings. In addition, loosely defined relationships exist between many items and their domains, as defined by the metadata tables. For current information and diagrams, please review the information in the *Contractor Package*.

Fields and associated data must link between all related feature classes in the *Operational_data_<BAPID>.gdb*. For example, a one-to-one relationship between the *TEI_Long_Tbl* and *TEI_Usr_Dfn_Data* must exist. The fields contained in *TEI_Usr_Dfn_Fields* must also link to content within *TEI_Usr_Dfn_Data*. In addition, linkages between non-spatial and spatial data, such as aspatial plot data, and the *TEI_Sample_Site_Points* and *TEI_Long_Tbl* (SMPL_TYPE / FLDNUM fields), must occur. Refer to field descriptions and instructions/comments for each feature class in the *Database Dictionary* or the *Metadata_Tables* found within the *Contractor Package*.

3.5 Domains and Ranges

Specific domains and ranges for fields in deliverable feature classes are detailed in the *Domains_Ranges* table within the *Contractor Package*. The *Metadata_Items* table in the *Tools_and_Templates.gdb* specifies ranges and references the *Domain_<name>* for each *FGDB_Name*. This information is used by the Validation tool in the *Contractor Package*. This tool will flag domain and range errors in output error report tables that can be joined to the *TEI_Long_Tbl* by *TEIS_ID*.

3.6 User-Defined Data

User-defined data can take three forms:

1. New values for existing fields (e.g., new ecosystem units or new site series modifiers for a project in the *SITE_MIA* and *SITE_MIB* fields of the *TEI_Long_Tbl*).
2. Existing fields and values defined in the *Tools_and_Templates.gdb* within the *Contractor Package* but not currently assigned to any TEIS Environment feature classes or tables (i.e., soils fields and domains).
3. New fields and values that do not currently exist in any TEIS Environment feature classes or tables (mapper initials, aspect, snow depth, wildlife habitat ratings etc.).

Requests for proposing new user-defined values for existing fields can be submitted to TEI_mail@gov.bc.ca using the *TEI Project Information Submission* template as well as the *TEI_Usr_Dfn_Domains* table feature class in the *Stage1.gdb* within the *Contractor Package*. Any new values proposed and submitted in feature classes and tables must conform to the domains, ranges, and cross-field relationships as specified in the *Contractor Package Tools_and_Templates.gdb*, *Metadata_Items* (i.e., *Database Dictionary*) and *Metadata_Tables* (i.e., *Domains_Ranges*). Values must be submitted and approved by the TEI Unit and Regional Ecologist(s) **prior to the submission of final deliverables**. See Section 2.6 for information specific to proposing new ecosystem unit/code(s) values for projects.

However, if any existing or new user-defined fields (i.e., fields that do not already exist) will be submitted, they need not be pre-approved, and can be added to the *TEI_Usr_Dfn_Data* table, which initially includes only the required fields *PROJPOLYID*, and *BAPID*. The *PROJPOLYID* field must contain unique values, and the records in this table must match 1:1 with those in *TEI_Long_Tbl* or other associated feature classes in the *Operational_data_<BAPID>.gdb*.

Any existing user-defined fields defined in the *Tools_and_Templates.gdb* within the *Contractor Package* must use the field definitions, descriptions, and domains provided to validate the fields and aid in data capture. Descriptions of the new user-defined fields must be added as records in the *TEI_Usr_Dfn_Fields* table with values defined in the *TEI_Usr_Dfn_Domains* table. The purpose of these tables is to define the properties and values of the new field, such as data type, valid attribute domains, and ranges. This table follows the format of the previous TEM standard for submission of user-defined field metadata as a CSV file. Information submitted in the *TEI_Usr_Dfn_Fields* and *TEI_Usr_Dfn_Domains* table must also be reported in other project metadata and reports, where applicable.

Templates for these two tables are also included in the *Stage1.gdb*, part of the *Contractor Package*. See the *Database Dictionary* for a full description of the tables.

The provided *TEI_Usr_Dfn_Data*, *TEI_Usr_Dfn_Fields*, and *TEI_Usr_Dfn_Domains* templates must be used to store all user-defined data submitted for all associated feature classes. Additional user-defined tables referring to a particular feature class must not be created (i.e., *User_Dfn_Data_Sample_Site_Points* or *User_Dfn_Fields_Sample_Site_Points*). The “APPLIES” field in *TEI_Usr_Dfn_Fields* must be used to indicate the feature class.

3.7 Metadata

Metadata on all datasets and project level information are required in each data submission. For each project, project-level information is submitted in the *TEI_Project_Details* table. See Section 3.3.

The *Contractor Package* metadata are held directly in the *Tools_and_Templates.gdb* tables, as are data lookup (domain) codes, item definitions, and numeric ranges for use in data validation and quality assurance.

There is currently no requirement to fill out the Esri metadata associated with the geodatabase or feature classes. However, some basic information can be entered, including references to the feature classes containing metadata information. Note that this information will not be entered into the provincial data holdings and that all relevant metadata must be entered into the appropriate tables and feature classes.

3.8 Digitizing and Attributing Polygons

Table 2 lists recommended guidelines for maximum zoom for digitizing polygons.

Table 2: Recommended maximum digitizing zoom

Project Scale	Recommended Zoom Scale	Detailed Polygon Zoom Scale (Riparian, Wetland)
1:5 000	1:2 500	1:2 000
1:10 000	1:5 000	1:4 000
1:20 000	1:10 000	1:6 000
1:50 000	1:25 000	1:20 000

Additional recommendations for digitizing and attributing polygons include:

- Polygons should be completed in their entirety along project boundaries. If a project boundary intersects a polygon, it should be completed and extend beyond the project boundary rather than delineating an incomplete polygon and stopping short of the full feature at a pre-determined boundary. Where possible, polygons with area that extends past a project boundary, should follow landscape characteristics (within reason, e.g., rivers will have to be cut off mid-feature).

- Spatial gaps are not permitted between polygons within the boundary for projects where a seamless product across the entire project area is required (e.g., TEM). Exceptions to seamless terrestrial coverage include areas of ocean between mapped islands/islets. In some circumstances, delineated polygons may lack attribution, due to limiting factors such as scope, cost, area of interest location, etc. Typically, these situations occur in phased projects where these delineated polygons are intended to be attributed at a future date. These polygons must be assigned a value of “Not Mapped” with the associated information: *SDEC_I* = 10, *SITEMC_SI* = NM, *REALM_I* = T, *SITE_SI* = 00, *TDEC_I* = 10, *SURFM_I* = N, *POLY_COM* = “add information to identify that this polygon was not assessed/mapped/attributed and include associated rationale/plan for attribution.” For large unmapped area, such as private land or specific biogeoclimatic units, in seamless mapping projects that represent a gap in the mapping area (i.e., “placeholder” or “doughnut” polygon), “Not Mapped” (NM) can also be used but must contain no other additional attributes other than in the Polygon Comments field (i.e., *POLY_COM* = “add information to identify that this polygon was not assessed/mapped/attributed and include associated rationale/plan for attribution”).
- For projects where mapping consists of multiple disjoint polygons in a study area, such as SEI or TSM, the non-sensitive polygon in SEI must be assigned an SEI class of “NS” and the stable polygon in Terrain Stability Mapping must be assigned a stability class of “S”. “Not Mapped” (NM) must not be used in these cases.

3.9 Digitizing Arcs, Lines, or Polylines

Linear features having a defined discernible gradient or direction of flow (e.g., rivers, pipelines, slides) must be digitized in the downward or downstream direction.

3.10 Minimum Feature Size

Table 3 lists recommended guidelines for minimum feature sizes and minimum feature widths for different mapping scales. There may be slight variations from these recommendations due to the approach used and the intended resolution of the map being produced. Wide variations from these recommendations may result in geometry errors when processing the spatial data. Refer to the specific field inventory standards as appropriate for the inventory type.

Table 3: Minimum feature size recommendations

Mapping Scale	Recommended Minimum Feature Area (on ground)	Recommended Minimum Feature Width (on ground)
1:5 000	0.5 hectares	5 metres
1:10 000	1.0 hectares	10 metres
1:20 000	2.0 hectares	20 metres

1:50 000	5.0 hectares	50 metres
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3.11 Quality of Digital Data Capture

Quality of digital data capture is composed of accuracy, resolution, and tolerance. These requirements will change depending upon the inventory scale and user requirements. This information must be specified for each project in the project metadata and reports, where applicable, and included with data submission.

Required quality of digital data capture should be stated for each feature type, or group of feature types. In the case of positional accuracy, quality of digital data capture is usually specified in terms of maximum error. Error may be specified as percent probability:

90% of all points must be positioned on NAD83 within 10 metres. All points must be within 25-metre accuracy on NAD83 (The NAD83 datum on the ground is defined by geodetic control monuments and Active Control Points as maintained by GeoBC.).

or as statistical error:

Any sample of at least 3% of points must have less than a 10-metre Root Mean Square Error when compared to their surveyed locations.

3.11.1 Interpretation Accuracy/Error

Accuracy and error are also dependent upon the scale and inventory type being performed. Refer to the appropriate RISC standard and include the SIL/TSIL as project level metadata in the *TEI_Project_Details* table.

3.11.2 Resolution and Tolerance

It is not recommended to change the default XY resolution and tolerance values (0.0001 m and 0.001 m, respectively) for feature class templates in the *Contractor Package*. Older data in other spatial formats stored with lower precision can be imported to these feature class templates without introducing significant geometric error. See documentation included with Esri ArcGIS Desktop software or online for detailed information.

3.12 Elevation (Z-Axis) Data

The feature class templates included in the *Contractor Package* are not meant to store three-dimensional data. Any Z-values included with input features will not be incorporated into the templates.

3.13 Tiles

Data must be provided in a single seamless dataset, not in separate tiles defined by any standard or non-standard mapsheet grid. This is particularly important when updating legacy mapping for incorporation into new projects.

4 GIS Quality Assurance Procedures

Quality Assurance (QA) and Quality Control (QC) of the digital data are based primarily on the utilization of the *Contractor Package* through templates and validation tools that perform automated error detection and reporting. QA is a proactive process with a focus on preventing errors. QC is a reactive process that focuses on identifying issues. QA/QC ensures that the approaches, techniques, methods, and processes designed for the project are implemented and followed correctly. QA/QC activities monitor and verify that the project deliverables meet the defined quality standards. The *Contractor Package* contains a checklist for contractors or data submitters that outlines and provides instructions for TEI project stages from project initiation through to data submission, including data capture and QA/QC validation rules. Quality assurance of the inventory content is achieved through internal quality control procedures and/or third-party quality assurance.

Guidelines are available at the following link:

<https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/ecosystems/tei-standards>

4.1 Attributes

Attribute field names and field types must match those of the templates provided in the *Tools_and_Templates.gdb* in the *Contractor Package*. Values in the submitted feature classes and tables must conform to the domains, ranges, and cross-field relationships as specified in the *Contractor Package Tools_and_Templates.gdb Metadata_Items* (i.e., *Database Dictionary*) and *Metadata_Tables* (i.e., *Domains_Ranges*). The *Contractor Package* includes tools for validating attribute values and producing error reports to aid in the quality assurance process.

4.2 Geometry

Feature classes must not contain any invalid or null geometry. The *Contractor Package* includes a *Validate Geometry* tool, which must be executed against each deliverable feature class before submission. Esri ArcGIS Desktop also includes tools for identifying and repairing geometry errors. See the documentation included with Esri ArcGIS Desktop software or online for details.

4.3 Topology

The QA/QC process, prior to loading into the *Contractor Package* feature class templates for data submission, must include the creation and validation of a topology on each feature class to be submitted using the standard tools available in ArcGIS Desktop. Topology validation on adjacent existing data being edge-matched to must also occur to ensure a seamless product (refer to Section 4.4). See the documentation included with the ArcGIS Desktop software for details on creating and validating topologies. Example ArcGIS Pro Geodatabase Topology Rules for polygon, lines, and point features are outlined below:

Polygon Features:

- Must Not Overlap
- Must Not Have Gaps
- Area Boundary Must Be Covered By Boundary Of

Line Features:

- Must Not Self-Overlap
- Must Not Self-Intersect
- Must Be Single Part
- Must Be Inside

Point Features:

- Must Be Disjoint
- Must Be Covered By Boundary Of

Gaps should not exist between polygons in the dataset except for gap areas that have not been mapped (e.g., areas of ocean between mapped islands). See Section 3.8 for additional information. In addition, each feature in a feature class must be a single part. See the documentation included with the ArcGIS Desktop software for details on data management tools related to single-part and multi-part features.

Any errors identified by topology validation must be eliminated before submission, with the exception of gaps as described above. Polygon and line features should also be given as input to the ArcGIS *RepairGeometry* tool to identify and eliminate features with self-intersecting boundaries or null geometry.

4.4 Adjacent Project Boundaries

The boundary polygons for adjacent projects of a similar project type and mapping scale must be obtained from the provincial repository. Where adjacent projects occur, the polygons of the current project must be aligned such that no gaps or overlaps exist between the polygons of the feature class being submitted and the adjacent project boundary polygon (refer to Section 4.3). A variance can be requested if this requirement interferes significantly with project purpose and boundaries – see Section 2.4. Detailed polygon linework should consider the attributes and linework of any adjacent project’s detailed polygons and should match where appropriate. Esri’s ArcGIS Desktop includes tools for reshaping edges and snapping together adjacent polygon boundaries. See the documentation included with ArcGIS Desktop software for details.

5 Non-spatial Data Specifications

5.1 File Naming Conventions

All project deliverables files are to be named using the following general convention: <broad project type>_<BAPID>_<thematic content>.<extension>. For example, *ter_1234_rpt.pdf* for a terrain project report.

If multiple files exist, such as field photographs, plot cards, or maps, they must be zipped into *tem_1234_img.zip* with individual files numbered using a short logical description of the grouping, such as plot number or general content or area descriptor. For example, *tem_1234_img_<PLOT#>.jpeg* or *pem_1234_map_<StudyArea >.pdf*

If multiple iterations of a specific type, such as QA or AA documentation, are delivered, each must be named sequentially; for example, *pem_1234_aa02.pdf* and *pem_1234_aa03.pdf*.

Broad project types are listed in the domain tables within the *Contractor Package*. Thematic content details, including naming conventions and example file formats, are provided in Table 4.

Table 4 – Thematic content codes and formats for the naming of files

Code	Description	File Naming Convention	Example Format(s)	Original Source
aa	accuracy assessment	<Broad Project Type>_<BAPID>_aa.pdf e.g., <i>pem_1234_aa01.pdf</i>	PDF	TEI Digital Standards (2015)
aud	sound recordings	<Broad Project Type>_<BAPID>_aud_<unique identifier>.<file extension> e.g., <i>whr_1234_aud_<PLOT#>.mp3</i>	MP3/AAC/WAV/FLAC Zip individual files for submission e.g., <i>whr_1234_aud.zip</i>	Added Version 3.0 (2023)
bgc	non-spatial biogeoclimatic documentation	<Broad Project Type>_<BAPID>_bgc.pdf e.g., <i>pem_1234_bgc.pdf</i>	PDF	TEI Digital Standards (2015)
cert	project completion certificate	<Broad Project Type>_<BAPID>_cert.pdf e.g., <i>tem_1234_cert.pdf</i>	PDF	TEI Digital Standards (2015)
eci	field data	<Broad Project Type>_<BAPID>_eci.<file extension> e.g., <i>tem_1234_eci.mdb</i>	MDB/XLSX/CSV	TEI Digital Standards (2015)
el	expanded legend	<Broad Project Type>_<BAPID>_el.pdf e.g., <i>tem_1234_el.pdf</i>	PDF	TEI Digital Standards (2015)
fld	field forms	<Broad Project Type>_<BAPID>_fld_<unique identifier>.pdf e.g., <i>tem_1234_fld_<PLOT#>.pdf</i>	PDF Zip individual files for submission e.g., <i>tem_1234_fld.zip</i>	Added Version 3.0 (2023)
idq	input data quality	<i>pem_<BAPID>_idq.pdf</i> e.g., <i>pem_1234_idq.pdf</i>	PDF	TEI Digital Standards (2015)

Code	Description	File Naming Convention	Example Format(s)	Original Source
img	photos and georeferenced photos	<Broad Project Type>_<BAPID>img_<unique identifier>.<file extension> e.g., <i>tem_1234_img_<PLOT#>.jpeg</i>	JPEG/TIFF/PNG/PDF Zip individual files for submission e.g., <i>tem_1234_img.zip</i>	Added Version 3.0 (2023)
inp	input (metadata and/or database)	pem_<BAPID>_inp.pdf e.g., <i>pem_1234_inp.pdf</i>	PDF (metadata)/XLSX/CSV (database) Zip individual files for submission e.g., <i>pem_1234_inp.zip</i>	TEI Digital Standards (2015)
kb	knowledge base	pem_<BAPID>_kb.pdf e.g., <i>pem_1234_kb.pdf</i>	PDF	TEI Digital Standards (2015)
lut ¹	lookup table	<Broad Project Type>_<BAPID>_lut.xlsx e.g., <i>tem_1234_lut.xlsx</i>	XLSX/CSV	Added Version 3.0 (2023)
map	maps	<Broad Project Type>_<BAPID>_map_<unique identifier>.<file extension> e.g., <i>tem_1234_map.pdf</i>	Georeferenced PDF Zip individual files for submission e.g., <i>tem_1234_map.zip</i>	TEI Digital Standards (2015)
ml	map legend	<Broad Project Type>_<BAPID>_ml.pdf e.g., <i>tem_1234_ml.pdf</i>	PDF	TEI Digital Standards (2015)
non	non-standard input (metadata and/or database)	pem_<BAPID>_non.pdf e.g., <i>pem_1234_non.pdf</i>	PDF (metadata)/CSV (database) Zip individual files for submission e.g., <i>pem_1234_non.zip</i>	TEI Digital Standards (2015)

¹ For use in cross-walking between classifications (i.e., TEM to SEI) or assigning known TEI attributes (i.e., Realm, Group, Class)

Code	Description	File Naming Convention	Example Format(s)	Original Source
qa	quality assurance	<Broad Project Type>_<BAPID>_qa.pdf e.g., <i>pem_1234_qa.pdf</i>	PDF	TEI Digital Standards (2015)
rpt	report	<Broad Project Type>_<BAPID>_rpt.pdf e.g., <i>tem_1234_rpt.pdf</i>	PDF	TEI Digital Standards (2015)
rpt_ap#	report appendix	<Broad Project Type>_<BAPID>_rpt_ap_<unique appendix identifier>.pdf e.g., <i>whr_1234_rpt_ap_a.pdf</i>	PDF	WHR Data Submission Standards (2004)
rpt_fig#	report figure	<Broad Project Type>_<BAPID>_rpt_fig_<unique figure identifier>.pdf e.g., <i>whr_1234_rpt_fig_1.pdf</i>	PDF	Added Version 3.0 (2023)
rt	ratings table	<Broad Project Type>_<BAPID>_rt.xlsx e.g., <i>whr_1234_rt.xlsx</i>	XLSX/CSV	SEI Standards (2006)/ WHR Data Submission Standards (2004)
rt##_cvr	ERM ratings table tool check-validity results report	<Broad Project Type>_<BAPID>_rt_<unique identifier>_cvr.txt e.g., <i>whr_1234_rt01_cvr.txt</i>	TXT	WHR Data Submission Standards (2004)
scr	Scripts (python/R)	<Broad Project Type>_<BAPID>scr_<unique run # identifier>.py e.g., <i>pem_1234_scr_1a.py</i>	PY/ R	Added Version 3.0 (2023)
sp	sampling plan	<Broad Project Type>_<BAPID>_sp.pdf e.g., <i>tem_1234_sp.pdf</i>	PDF	TEI Digital Standards (2015)

Code	Description	File Naming Convention	Example Format(s)	Original Source
species code	WHR species account	whr_<BAPID>_<species code>.pdf e.g., <i>whr_1234_modhe.pdf</i>	PDF	WHR Data Submission Standards (2004)
species code_life requisite code	WHR ratings model	whr_<BAPID>_<species code>_<life requisite code(s)>.pdf e.g., <i>whr_4210_modhe_fdlw.xlsx</i>	XLSX/CSV	WHR Data Submission Standards (2004)
sts	structural stage	<Broad Project Type>_<BAPID>_sts.pdf e.g., <i>pem_1234_sts.pdf</i>	PDF	TEI Digital Standards (2015)
vid	videos and movies	<Broad Project Type>_<BAPID>_vid_<unique identifier>.<file extension> e.g., <i>tem_1234_vid_<PLOT#>.mp4</i>	MP4/MOV Zip individual files for submission e.g., <i>tem_1234_vid.zip</i>	Added Version 3.0 (2023)
wl	working legend	<Broad Project Type>_<BAPID>_wl.pdf e.g., <i>tem_1234_wl.pdf</i>	PDF/XLSX/CSV	TEI Digital Standards (2015)

5.2 Project Report(s)

TEI projects must be accompanied by a project report written by or under the direct supervision of the qualified professionals for each discipline contributing to the project. A signed and sealed final version must be submitted in accordance with the *Professional Governance Act* (PGA).

The report title page must contain the follow:

- Title (including project type)
- Date
- BAPID number
- Company/Organization
- Lead author with credentials (other authors can be listed with credentials as needed)
- Prepared for (company or other client information)
- Recommended citation

The project report must contain sections that address the following:

- Project objectives/purpose

- First Nations considerations (study area overlap with communities and treaty areas, First Nations values, etc.) (refer to Section 2.1)
- Background/review of existing information (refer to Section 2.2, Table 1)
- Study area description with information relevant to the inventory type (physiography, surficial geology, soils, disturbance history, BGC, list of existing adjacent and/or overlapping BAPIDs for project type, etc.), as well as a map depicting the area location within the province
- Methodology, including any assumptions, use of existing data, approved variances to the standards, BGC linework changes, use of new ecosystem mapping codes, use of user-defined data, and quality control procedures
- Description of all map entities
- Results/Discussion
- Recommendations
- Limitations of the inventory, data, concepts, conclusions, understanding, and recommendations
- References

Reports should refer to the standards outlined in this document, and all other applicable Provincial or Federal regulations, standards, and guidelines. If the project requires a methodology that deviates from the standard, the rationale must be documented, provided to the Province for approval as part of the Variance process (Section 2.4) and approved by qualified practitioners. A defined methodology aids in making the results of the project repeatable and understandable by the community of practice and future users of the data collected.

All appendices, figures, scanned documents, photos, legends, maps, and/or other tables must be included in the project report. If the resulting project file becomes too large, the expanded legend, working legend, maps, and other image or text information can be submitted separately from the project report. Files that are submitted separately are to be named following the standard file naming conventions as outlined in Section 5.1.

5.3 Field Data

Field data collection must adhere to safety and quality management regulations. Field data quality management procedures and processes must ensure that field data support the mapping process and documented purpose and scope. The Field Manual for Describing Terrestrial Ecosystems (BC FLNRO and BC MOE 2010 ver. 2023) outlines mandatory fields required by plot type for ecosystem data.

If a digital data capture system has not been used, the field data must be entered into a digital format compatible with VPro (VENUS Professional), so that they are easily stored and accessible for analysis. VPro is the BEC program's software for managing the Province's ecosystem plot data and ecosystem classification. It allows users to manipulate, summarize, and analyze data in hierarchical classifications. VPro is freeware (<https://www.for.gov.bc.ca/hre/becweb/resources/software/vpro/index.html>), developed and managed by the Ministry of Forests.

If paper forms are filled out in the field, along with the digital data entry, they must be scanned into one PDF and submitted. Forms must be scanned so that they are all oriented in the same direction. Scans of paper forms must be legible. If multiple files are scanned, they

must be zipped into *tem_1234_fld.zip* with individual files numbered using a logical description of the grouping (e.g., *tem_1234_fld_<PLOT#>.pdf*).

In addition, linkages between non-spatial and spatial plot data, using the SMPL_TYPE / FLDNUM fields, must be present in all applicable data (e.g., including the *TEI_Sample_Site_Points* and/or *TEI_Sample_Site_Lines* and *TEI_Long_Tbl*). Refer to field descriptions and instructions/comments for each feature class in the *Database Dictionary*.

Submission of photos, georeferenced photos, and/or videos from fieldwork is recommended as these are beneficial to both mappers and users of the project data. Photographs/videos must be compressed into a zip file and follow the standard naming conventions outlined in Section 5.1. If any people (recognizable or otherwise) are visible in the photos, consent and release forms must be included in the zip file for each individual person.

- https://www2.gov.bc.ca/assets/gov/british-columbians-our-governments/services-policies-for-government/service-experience-digital-delivery/bcgovernment_consent_model_release.pdf

5.4 Quality Assurance and Quality Control

QA/QC documentation must indicate which steps in the mapping process were reviewed and confirm that the final deliverables are in accordance with the applicable standards. QA/QC reporting may be performed by a qualified third party, including TEI Unit representatives, or may be completed internally by a mapping contractor. In both cases, the applicable QA reports and project completion certificate assuring the quality of the deliverables must be signed off. An example template for *TEI_QA_ProjectStatus* is available within the *Contractor Package*. Refer to Section 5.1 for file naming conventions for QA/QC files and consult the most current version of the inventory-specific QA guidelines for further explanation of the QA review procedures.

The practitioner must retain a copy of their work after the project has been signed off for the period of time indicated by their professional association legislation or for any period of time indicated in relevant legal documentation.

Qualified professionals must adhere to quality management processes and procedures as required by their governing body under quality management-related provisions in the *Professional Governance Act* and Bylaws. Documentation including, but not limited to, internal and/or third-party QA, proof of adequate supervision of technical and junior staff, and professional registration and standing, must be maintained and may be required in an audit. For example, terrain mapping projects completed and signed off by a professional geoscientist must follow EGBC's Quality Management Guidelines. It is critical that work, such as attribution, is completed by or under the direct supervision of the signing professional in areas of reserved practice.

5.5 Accuracy Assessment

Final Accuracy Assessment (AA) reports and associated data must be submitted to TEI_Mail@gov.bc.ca. Refer to Section 5.1 for file naming conventions for AA files and consult the "Protocol for Accuracy Assessment of Ecosystem Maps" found here: <https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/ecosystems/tei-standards>

The practitioner should retain a copy of their work after the project has been signed off for the period of time indicated by their professional association legislation or for any period of time indicated in relevant legal documentation.

5.6 Sign-off Letter/Project Completion Certificate

The Sign-off Letter or Project Completion Certificate must certify that the project data delivered are complete and meet the appropriate mapping standards (TEM/PEM/SEI, etc.) and those specified in this document. A template is provided within the *Contractor Package* as an example of a Project Completion Certificate that can be used by professionals to certify that the project data delivered are complete and meet the appropriate Provincial mapping standards required for loading to the BCGW. In no way does submission of a Project Completion Certificate absolve the professional of the duty of due diligence in ensuring that the project deliverables meet all the required specifications and standards. Professionals must ensure that they are meeting any requirements as a practising professional as regulated by any applicable governing body and/or associated legislation (i.e., the *Professional Governance Act*). Refer to Section 1.5 for more information on professional accountability and mapper qualifications and to Section 5.1 for file naming conventions.

6 Data Submission

The Executive Director of the Knowledge Management Branch, BC Ministry of Water, Land and Resource Stewardship, is the provincial data custodian for all Terrestrial Ecosystems Information collected and produced in accordance with the standards set by RISC. Therefore, all RISC standard provincially funded TEI project data must be submitted to WLRS. Project data funded by other levels of government, by the private sector, or other proponents, particularly those funded by, or collected in partnership with, the Provincial Government, should also be delivered to WLRS via the TEI Unit. Where appropriate, these project data will be loaded to the provincial repositories to facilitate access.

6.1 Final Deliverables

All TEI projects should be submitted to the Province so that they can be added to the provincial repository. The TEI Unit has processes and procedures in place to deal with “sensitive” data, including publishing project boundaries only or restricting data access. If project data are deemed “sensitive,” a Data Sharing Agreement may be required to specify access, distribution, and use restrictions. All projects held within the TEI provincial repository not categorized as “sensitive” are distributed under an [Open Government Licence](#), and therefore, submitters must have the authority to grant the distribution of the submitted data under the Open Government Licence terms and conditions.

All project deliverables must be submitted to the Ministry of Water, Land and Resource Stewardship by contacting the TEI Unit, via TEI_Mail@gov.bc.ca and referencing the BAPID number.

Deliverables must be placed in a single ZIP file, using the standard folder structure, file formats, and naming conventions specified below. All non-spatial files are to be delivered in the ZIP folder with the format and naming conventions outlined in Section 5.1. The spatial files are to be delivered in the same ZIP folder using a subfolder named:

- <project type>_<BAPID>_Spatial

Example Deliverable folder and file structure:

- tem_1234.zip
 - tem_1234_spatial
 - Operational_Data_1234.gdb
 - tem_1234_rpt.pdf
 - tem_1234_eci.mdb
 - tem_1234_wl.pdf
 - tem_1234_qa.pdf
 - tem_1234_cert.pdf

Any non-standard spatial data files (shape files, CAD based files, etc.), plot files (HPGL/2: HP2, Raster Transfer Language: .RTL, .PostScript: PS, etc.), and non-spatial files that are in non-standard formats, including source or input data files, may be submitted to the Province in addition to the required files in the standard formats. If submitted, they must adhere to the same file naming conventions (<project type>_<BAPID>_<file type>) and be delivered in the same ZIP folder as the standard files. All non-standard files will be stored with the rest of the project data and be accessible to all potential users. The Province recognizes that these alternative file formats may be preferred by some mapping project clients or data users, and therefore wishes to support ease of access to data in these alternative formats. The Province, however, is not in a position to offer any level of technical support for any data or deliverables that are not in the mandatory/current standard. Non-standard data will be maintained in the original condition as they were delivered. Refer to the Terrain, TEM, PEM, and SEI inventory standards for clarification on the information requirements of these different project types.

Professionals must ensure that they are meeting any requirements as a practising professional as regulated by any applicable governing body and/or associated legislation (i.e., the *Professional Governance Act*). Refer to Sections 1.5, 5.4, and 5.6 for more information on professional accountability and mapper qualifications.

7 List of Acronyms, Abbreviations, and Initialisms

AA	Accuracy Assessment
ABCFP	Association of BC Forest Professionals
ASTTBC	Applied Science Technologists and Technicians of BC
BAPID	Business Area Project Identifier
BC FLNRO	British Columbia Ministry of Forests, Lands and Natural Resource Operations
BCGW	British Columbia Geographic Warehouse
BCIA	BC Institute of Agrologists
BC MOE	British Columbia Ministry of Environment
BCSEE	BC Species and Ecosystems Explorer

BEC	Biogeoclimatic Ecosystem Classification
BEI	Broad Ecosystem Inventory
BEM	Broad Ecosystem Mapping
BEMVRI	Broad Ecosystem Mapping Vegetation Resource Inventory
BGC	Biogeoclimatic
CAB	College of Applied Biologists
CLIR	Cross-Linked Information Resources
DEM	Digital Elevation Model
DISA	Data and Information Sharing Agreement
EcoCat	Ecological Reports Catalogue
EGBC	Engineers and Geoscientists of BC
EIRS BDP	Biodiversity/Environmental Information Resources e-Library
EIRS EP	Environmental Protection Information Resources e-Library
FCODE	Feature Code
FGDB	File Geodatabase
GIS	Geographical Information System
LMH	Land Management Handbook
LRDW	Land and Resource Data Warehouse
OGC	Open Geospatial Consortium
OSPG	Office of the Superintendent of Professional Governance
PAg	Professional Agrologist
PEM	Predictive Ecosystem Mapping
PGA	Professional Governance Act
PGeo	Professional Geoscientist
QA	Quality Assurance
QC	Quality Control
RPF	Registered Professional Forester
RIC	Resources Inventory Committee
RISC	Resources Information Standards Committee
RPBio	Registered Professional Biologist
SDM	Species Distribution Mapping
SEI	Sensitive Ecosystem Inventory
SIL	Survey Intensity Level
SOIL	Soil Survey
TBT	Bioterrain Mapping

TEI	Terrestrial Ecosystem Information
TEIS	Terrestrial Ecosystem Information System
TEM	Terrestrial Ecosystem Mapping
TIM	Terrain Inventory Mapping
TRIM	Terrain Resource Information Mapping
TSIL	Terrain Survey Intensity Level
TSM	Terrain Stability Mapping
WET	Wetland Inventory
WLRS	BC Ministry of Water, Land and Resource Stewardship
WHR	Wildlife Habitat Rating

8 References

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